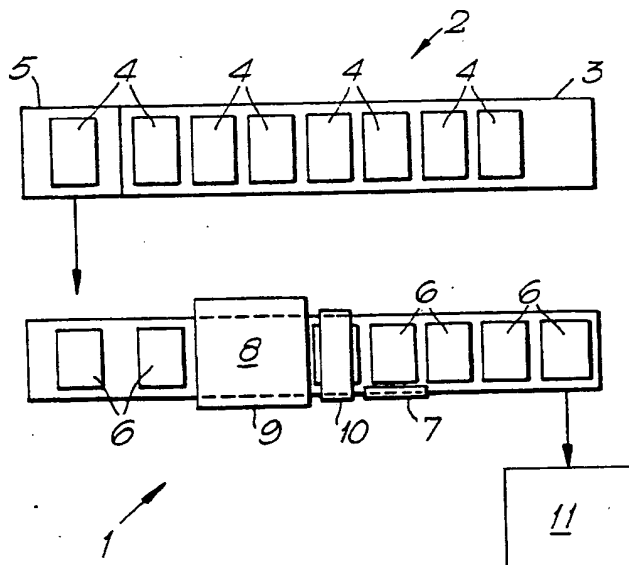




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(54) Title: IMPROVEMENTS RELATING TO CIGARETTE PACKAGING MACHINERY



(57) Abstract

The invention comprises a cigarette packing machine (1) capable of receiving and folding packaging material (6) and provided with a printing unit (8) capable of printing on the packaging material whilst the material is in transit of the packing machine packing line. A quick-drying ink or UV-responsive ink is utilised to allow for subsequent folding (7) or other working of the packaging material without detriment to the new print. The invention provides for the printing at a late stage of information which is highly time variable, such as price markings, tar and nicotine deliveries, etc. Thus the need for large stores of pre-printed material and wastage thereof is eliminated.

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Improvements Relating to Cigarette Packaging Machinery

This invention relates to printing of blanks for packages, particularly cigarette pack blanks, or cigarette carton blanks.

In the cigarette industry in particular, it is often necessary to add various types of additional pack information, such as price markings, manufacturing information or tar and nicotine deliveries to printed cigarette pack blanks and/or cigarette carton blanks. For example, in Switzerland the price of the cigarette pack must be printed on each pack. As the price varies, so the printed information on the pack will vary and this variation means that large amounts of price-printed pack blanks have to be kept in store. The disadvantages of this include the need for excess storage space, storage contamination problems, wastage of under-priced blanks and other economic aspects of high wrapping materials stocking.

It is presently the custom to overprint such additional information on pre-printed pack blanks in a separate print room. Often this involves extra materials handling in that the blanks held in the wrapping material store are transferred to the print room for overprinting and then returned to the wrapping materials store before transfer to the secondary manufacturing department.

It is an object of the present invention to allow for a

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decrease in materials handling in comparison with present printing procedures.

It is a further object to reduce the need for large numbers of differently printed pack or carton blanks to be held in a wrapping materials store.

The present invention provides a packing apparatus comprising a packing machine, pack blank feed means associated therewith for feeding single blanks to a first folding station of said machine, and a printing unit, said printing unit being located in the packing line of said packing machine.

A packing machine packing line comprises a packing machine and feed means associated therewith, the feed means being located adjacent the packing machine.

The present invention further provides a method of printing on packaging material, whereby a packing machine capable of receiving and folding packaging material is provided with a printing unit capable of operating on the packaging material whilst the material is in transit of the packing machine packing line.

Advantageously the printing unit comprises a printing ink source and a printing head. Preferably the ink is a quick-drying ink which dries in less than 2 seconds. The printing unit preferably also comprises a printing ink drying unit, if printing ink capable of drying alone is not used or available. In such instances the printing ink drying unit is suitably arranged immediately downstream of

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the printing head and printing ink source. Alternatively, the printing ink drying unit may be located within a printing unit housing. Suitably the printing ink drying unit is a UV light device which device is utilised in conjunction with a UV-curing ink, such as the ink used in a Metronic (Trade Mark) Vario Soft printer, although other suitable devices would be apparent to the skilled reader.

The printing unit may comprise, in an alternative, hot foil stamping apparatus comprising a forming head, foil tape supply means and foil tape feeding means, the forming head being capable of reciprocating movement into and out of contact with the foil tape, the foil tape being located between the forming head and the packaging material, so to provide a transfer of foil to the packaging material. The foil tape may comprise actual metal foil or ink, for example.

In a further alternative the printing unit may comprise ink jet printing apparatus.

Preferably the packing apparatus further comprises a pack blank reservoir capable of holding pre-cut, stacked pack blanks, and pack blank de-stacking means.

Preferably the printing unit is located upstream of the first folding station and advantageously between the de-stacking means and the first folding station. The printing unit may be located at or close to the first folding station, provided that the portion of the blank to be printed upon is maintained in a substantially flat aspect.

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The printing unit may also conceivably be located at a position downstream of the first folding station, again provided that the blank is maintained substantially flat at that portion where printing is to occur.

In a further alternative the printing unit may be located upstream of the de-stacking means. In such instance the printing unit may be provided with reservoir means capable of holding pre-cut, stacked or single pre-printed blanks upstream of the printing unit, and also with blank re-stacking means downstream of the printing unit. Suitably the blank re-stacking means is located downstream of printing ink drying means.

The packing machine may be a cigarette packing machine for producing either crushproof hinged-lid packs or soft cup 'American style' packs. The packing machine may also be a cigarette carton folding machine.

The present invention thus further provides on-line printing and packing apparatus comprising a supply reel for paper packaging material, feed means for feeding the paper packaging material from the supply reel to a pack reel cut-off device and an on-line printing unit. If the packing machine is a soft cup packing machine the printing unit and ink source are preferably located between the reel of packaging material and the reel cut-off device, or after the reel cut-off device where cut blanks are fed to folding stations.

Reference will now be made, by way of example, to the

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accompanying diagrammatic drawings wherein:

Figure 1 shows schematically a cigarette packing machine according to the present invention, and

Figure 2 shows schematically a cigarette packing machine similar to the machine of Figure 1, there being an alternative location of the printing unit.

Figure 1 shows schematically a cigarette packing machine 1 adapted according to the present invention. The packing machine 1 is capable of producing hinged-lid crushproof cigarette packs and has a pack blank reservoir 2 in the form of a flat band conveyor 3, which conveyor is capable of holding about sixteen stacks 4 of pre-printed pack blanks thereupon. At one end of the conveyor 3 there is provided a de-stacking device 5 which delivers single blanks in series to a first folding station 7 of the packing machine 1. Located between the de-stacking device 5 and the first folding station 7 is a printing unit 8. The printing unit 8 comprises a housing 9 holding offset letterpress printing rollers and a quick-drying ink source, and further comprises a UV drying unit 10 located downstream of the housing 9. In operation, single pre-printed pack blanks 6 pass through the printing unit housing 9 where quick-drying ink is applied to the pack blank in the required position and in the required format. The over-printed blanks then pass directly from the printing unit housing 9 to the drying unit 10 where the quick-drying ink is dried in a few seconds or less by exposure to UV light. The overprinted dried pack

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blanks then pass to the first folding station 7 and thence through the remainder 11 of the packing machine.

Figure 2 shows a similar packing machine to that described above and having an alternative arrangement according to the present invention. Like reference numerals refer to like features throughout. The flat band conveyor 3 has located above it a printing unit 8 which operates using offset letterpress techniques and which has an associated UV drying unit which is held within the printing unit housing 9. The printing unit inlet 12 is provided with a reservoir for stacked pre-printed blanks and the printing unit outlet 13 is modified to deliver stacked dried over-printed blanks to the conveyor belt 3 or to provide single blanks which can be manually or mechanically re-stacked on the conveyor belt 3.

Packing machines presently particularly suited to such an above-described arrangement include the GD-X2 packing machine made by G.D. Societa per Aziomi and the Molins HLP-1 packing machine.

When the inventive method is to be used in respect of soft cup 'American style' packs, the GD-X1 packing machine is particularly suited to such an inventive arrangement.

A skilled reader will appreciate that other machines may be modified to render such machines suitable for the above proposed inventive solution.

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CLAIMS

1. A packing apparatus comprising a packing machine (1) and pack blank feed means associated therewith for feeding single blanks to a first folding station (7) of said machine (1), characterised in that said apparatus further comprises a printing unit (8), said printing unit (8) being located in the packing line of said packing machine (1).
2. A packing apparatus as claimed in Claim 1, wherein said printing unit (8) comprises a printing ink source and a printing head.
3. A packing apparatus as claimed in Claim 1 or 2, wherein said printing unit (8) further comprises a printing ink drying unit (10).
4. A packing apparatus as claimed in Claim 3, wherein said printing ink drying unit (10) is a UV light device.
5. A packing apparatus as claimed in Claim 1, wherein said printing unit (8) comprises a hot foil stamping apparatus comprising a forming head, foil tape supply means and foil tape feeding means, the forming head being capable of reciprocating movement into and out of contact with the foil tape, the foil tape being located between the forming head and the packaging material, so to provide a transfer of foil to the packaging material.
6. A packing apparatus as claimed in Claim 1, wherein said printing unit (8) comprises an ink jet printing

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apparatus.

7. A packing apparatus as claimed in Claim 1, wherein said printing unit (8) comprises offset letterpress printing rollers.
8. A packing apparatus as claimed in Claim 1, wherein said apparatus further comprises a pack blank reservoir (2) capable of holding pre-cut, stacked pack blanks, and pack blank de-stacking means (5).
9. A packing apparatus as claimed in Claim 1, wherein said printing unit (8) is located upstream of said first folding station (7).
10. A packing apparatus as claimed in Claim 8, wherein said printing unit (8) is located between the pack blank de-stacking means (5) and the first folding station (7).
11. A packing apparatus as claimed in Claim 1, wherein said printing unit (8) is located at or close to the first folding station (7).
12. A packing apparatus as claimed in Claim 1, wherein said printing unit (8) is located downstream of said first folding station (7).
13. A packing apparatus as claimed in Claim 9, wherein said printing unit (8) is located upstream of said de-stacking means (5).
14. A packing apparatus as claimed in Claim 13, wherein said printing unit (8) is provided with reservoir means capable of holding pre-cut, stacked or single pre-printed blanks upstream of the printing unit, and with

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blank re-stacking means downstream of the printing unit (8).

15. A packing apparatus as claimed in Claim 1, wherein said packing machine (1) is a cigarette packing machine or a cigarette carton folding machine.
16. A method of printing on packaging material, whereby a packing machine (1) capable of receiving and folding packaging material is provided with a printing unit (8) capable of operating on the packaging material whilst the material is in transit of the packing machine packing line.
17. A method of printing on packaging material as claimed in Claim 1, wherein the ink of said printing unit is quick-drying ink.
18. An on-line printing and packing apparatus comprising a supply reel for paper packaging material, feed means for feeding the paper packaging material from the supply reel to a pack reel cut-off device and an on-line printing unit (8).

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Fig. 1.

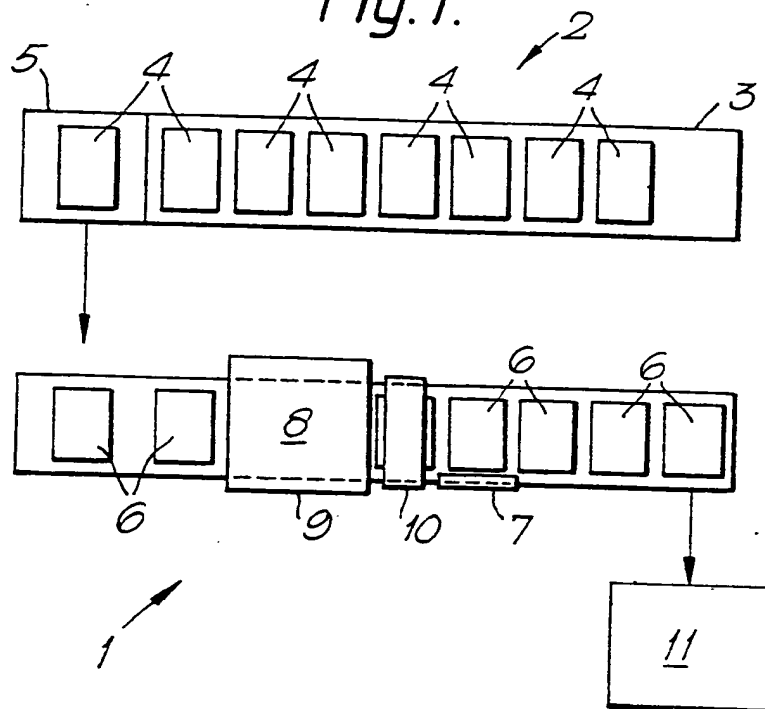
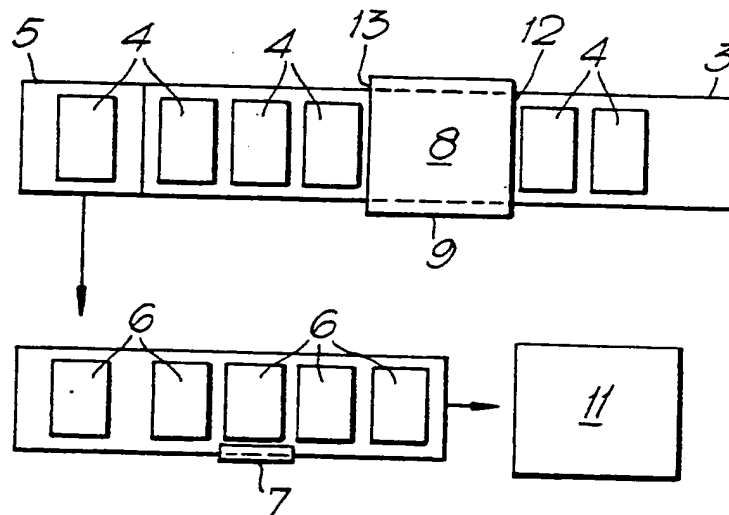


Fig. 2.



INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 91/00029

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ¹ According to International Patent Classification (IPC) or to both National Classification and IPC IPC ⁵ : B 65 B 61/02																				
II. FIELDS SEARCHED <div style="text-align: center; font-size: small;">Minimum Documentation Searched ⁷</div> <table style="width: 100%; border: none;"> <tr> <td style="width: 25%; border: none;">Classification System</td> <td style="border: none;">Classification Symbols</td> </tr> <tr> <td style="border: none; padding: 10px;">IPC⁵</td> <td style="border: none; padding: 10px;">B 65 B</td> </tr> </table> <div style="text-align: center; font-size: x-small; margin-top: 5px;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸</div>			Classification System	Classification Symbols	IPC ⁵	B 65 B														
Classification System	Classification Symbols																			
IPC ⁵	B 65 B																			
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹ <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <thead> <tr> <th style="width: 10%;">Category ¹⁰</th> <th style="width: 70%;">Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²</th> <th style="width: 20%;">Relevant to Claim No. ¹³</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; vertical-align: top;">X</td> <td style="vertical-align: top;">US, A, 3520104 (MIZELLE et al.) 14 July 1970 see column 5, line 4 - column 6, line 11; column 8, lines 30-61; column 12, line 51 - column 13, line 26; figures 1,2</td> <td style="vertical-align: top;">1,2,8,11, 12,15,16</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td style="text-align: center; vertical-align: top;">--</td> <td style="vertical-align: top;">5,9,10</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td style="vertical-align: top;">GB, A, 2135480 (BOBST) 30 August 1984 see page 1, line 126 - page 2, line 76; figure 1</td> <td style="vertical-align: top;">9,10</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">A</td> <td style="text-align: center; vertical-align: top;">--</td> <td style="vertical-align: top;">1,8,16</td> </tr> <tr> <td style="text-align: center; vertical-align: top;">Y</td> <td style="vertical-align: top;">GB, A, 2006686 (NORWOOD MARKING & EQUIPMENT) 10 May 1979 see page 2, lines 69-98; figure 1</td> <td style="vertical-align: top;">5</td> </tr> </tbody> </table>			Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	X	US, A, 3520104 (MIZELLE et al.) 14 July 1970 see column 5, line 4 - column 6, line 11; column 8, lines 30-61; column 12, line 51 - column 13, line 26; figures 1,2	1,2,8,11, 12,15,16	Y	--	5,9,10	Y	GB, A, 2135480 (BOBST) 30 August 1984 see page 1, line 126 - page 2, line 76; figure 1	9,10	A	--	1,8,16	Y	GB, A, 2006686 (NORWOOD MARKING & EQUIPMENT) 10 May 1979 see page 2, lines 69-98; figure 1	5
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¹⁰ Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "A" document member of the same patent family																		
IV. CERTIFICATION <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none; padding: 5px;"> Date of the Actual Completion of the International Search <div style="text-align: center; font-weight: bold;">28th March 1991</div> </td> <td style="width: 50%; border: none; padding: 5px;"> Date of Mailing of this International Search Report <div style="text-align: center; font-weight: bold;">17. 05. 91</div> </td> </tr> <tr> <td style="border: none; padding: 5px;"> International Searching Authority <div style="text-align: center; font-weight: bold;">EUROPEAN PATENT OFFICE</div> </td> <td style="border: none; padding: 5px;"> Signature of Authorized Officer <div style="text-align: center;">miss T. MORTENSEN </div> </td> </tr> </table>			Date of the Actual Completion of the International Search <div style="text-align: center; font-weight: bold;">28th March 1991</div>	Date of Mailing of this International Search Report <div style="text-align: center; font-weight: bold;">17. 05. 91</div>	International Searching Authority <div style="text-align: center; font-weight: bold;">EUROPEAN PATENT OFFICE</div>	Signature of Authorized Officer <div style="text-align: center;">miss T. MORTENSEN </div>														
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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages	Relevant to Claim No.
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X	GB, A, 2142282 (TOKYO AUTOMATIC MACHINERY WORKS) 16 January 1985 see page 2, lines 36-75; figure 1 -----	18

ANNEX TO THE INTERNATIONAL SEARCH REPORT
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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GB-A- 2135480	30-08-84	CH-A- 650722	15-08-85
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		NL-A- 7809535	27-04-79
FR-A- 2351011	09-12-77	None	
GB-A- 2142282	16-01-85	None	

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